

COMMENTS

I. INTRODUCTION

Initially, Applicants would like to thank the Examiner for indicating the allowability of claim 32 if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The specification has been amended above. Figs. 2 and 4 have been replaced with the replacement sheets attached herewith. Claims 1, 2, 6-8, 17-19, 22-26 and 32 have been amended. New claim 33 has been added. Claims 5, 9 and 21 have been cancelled without prejudice. Accordingly, claims 1-4, 6-8, 10-20 and 22-33 are under consideration in the present application. Provided above, please find a claim listing indicating the claim amendments, cancellations, addition of claim 33, and current status of the claims on separate sheets so as to comply with the requirements set forth in 37 C.F.R. § 1.121. It is respectfully submitted that no new matter has been added.

II. OBJECTION TO THE DRAWINGS SHOULD BE WITHDRAWN

The Examiner objects to the drawings under 37 C.F.R. §1.84(p)(5) because they include the following reference character(s) not mentioned in the description, i.e., references to 191, 455, 500, 502, 470 and 469.

Applicants respectfully submit that reference characters 191 and 469 have been deleted from the drawings in the replacement sheets submitted herewith. Further, the specification has been amended to include reference characters 455, 470, 500 and 502.

Accordingly, Applicants respectfully request withdrawal of the objection to the drawings.

III. OBJECTION TO THE CLAIMS SHOULD BE WITHDRAWN

The Examiner objects to the claims because claim 9 is allegedly unclear. Claim 9 has been cancelled without prejudice. Accordingly, the objection to the claims is moot and should be withdrawn.

IV. REJECTION UNDER 35 U.S.C. § 102(e) SHOULD BE WITHDRAWN

Claims 1-4, 12-13, 15-20 and 27 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 4,384,886 issued to Stiff (hereinafter “Stiff”). Claims 17-19, 21-25 and 27 stand rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 1,704,029 issued to Baily (hereinafter “Baily”).

Applicant respectfully asserts that the references identified above do not disclose the subject matter recited at least in amended independent claims 1 and 17 for at least the reasons provided herein below.

In order for a claim to be rejected as anticipated under 35 U.S.C. § 102, each and every element as set forth in the claim must be found, either expressly or inherently described, in a single prior art reference. Manual of Patent Examining Procedures, §2131; *also see Lindeman Maschinenfabrik v. Am Hoist and Derrick*, 730 F.2d 1452, 1458 (Fed. Cir. 1984).

Amended independent claim 1 recites, *inter alia*, a process for extraction of zinc and lead from a material containing one or more iron oxides, zinc oxide and lead oxide. The process recited in amended independent claim 1 comprises heating a composite body of said material and a carbonaceous material in a reduction zone containing a

reducing atmosphere at a temperature insufficient to effect melting of the iron in the material at a temperature and for a time sufficient to form a reductant from said carbonaceous material and to reduce a predetermined amount of the zinc oxide to zinc vapour, and reduce predetermined amounts of said iron oxides and lead oxides to iron and lead, respectively, collecting said zinc vapour and cooling it to form liquefied or solid zinc, further heating the material remaining, **after said zinc vapour has been collected**, to a temperature sufficient to effect melting of the iron and lead therein, and separately recovering molten iron and separately recovering molten lead therefrom.

Amended independent claim 17 recites, *inter alia*, an apparatus for extraction of zinc and lead from a material containing one or more iron oxides, zinc oxide and lead oxide. The apparatus recited in amended independent claim 17 comprises a first furnace chamber for receiving composite bodies that include said material and a carbonaceous material, wherein the first furnace chamber defines a reduction zone in which said composite bodies may be heated at a temperature insufficient to effect melting of the iron in the material but at a temperature and for a time sufficient to form a reductant from said carbonaceous material and to reduce a predetermined amount of the zinc oxide to zinc vapour, and reduce predetermined amounts of said iron oxides and lead oxides to iron and lead, respectively, a first arrangement configured to collect said zinc vapour from the first furnace chamber, a second arrangement configured to receive said collected zinc vapour for cooling the vapour to form liquefied or solid zinc, a second furnace chamber in communication with said first furnace chamber to receive therefrom material remaining **after said zinc vapour has been collected**, a heating arrangement configured to further heat the remaining material in the second furnace

chamber to a temperature sufficient to effect melting of the iron and lead therein, and a third arrangement configured to separately recover the molten iron and separately recover the molten lead therefrom.

Stift describes a process for removing zinc from oxide-containing iron sources. (See Stift, Abstract). However, Stift fails to disclose the a recovery of zinc and lead, as clearly recited in amended independent claims 1 and 17, and the Examiner does not contend that it does. Accordingly, Stift fails to anticipate at least amended independent claims 1 and 17.

Baily describes a process and apparatus for reducing ores and oxides used as ores. (See Baily, col. 1, Ins. 1-11). As provided in Baily, the ores can be zinc. (*Id*, col. 3, ln. 46). However, Baily fails to disclose zinc and lead, as clearly recited in amended independent claim 17, and the Examiner does not contend that it does.

Further, claim 17 recites, *inter alia*, a first arrangement configured to collect the zinc vapour from a first furnace chamber, a second arrangement configured to receive the collected zinc vapour for cooling the vapour to form liquefied or solid zinc, and a second furnace chamber in communication with said first furnace chamber to receive therefrom material remaining after said zinc vapour has been collected. The Examiner alleges that item 24 in Baily discloses the “first arrangement” of claim 17, and item 36 as the “second arrangement.” However, item 24 is an intake port, and not a “first arrangement configured to collect the zinc vapour *from a first furnace chamber*.” Baily, in col. 2, lines 102-109, states that “[t]he volatile products, if they carry a substance that it is desired to recover, may be carried **through the pipe 35** to the top of the condenser 36 when such constituent may be recovered by condensing or precipitation, the

remaining combustible gas being carried by the pipe 37 to the combustion chamber 26.” Accordingly, even if pipe 35 is alleged by the Examiner to disclose the “first arrangement” of claim 17, Baily fails to disclose a second arrangement configured to receive the collected zinc vapour for cooling the vapour to form liquefied or solid zinc, and further fails to disclose a second furnace chamber in communication with said first furnace chamber to receive therefrom material remaining after said zinc vapour has been collected, as recited in independent claim 17.

Accordingly, Baily fails to anticipate at least amended independent claim 17.

Thus, Applicants respectfully submit that the references of Stiff and Baily relied on by the Examiner fail to disclose, either expressly or inherently, each and every element of amended independent claims 1 and/or 17 as required by 35 U.S.C. § 102.

Accordingly, Applicant respectfully submits that the 35 U.S.C. § 102(b) rejections of independent claims 1 and 17 should be withdrawn. Regarding the § 102(b) rejections of claims 2-4, 12-13, 15-16, which depend from independent claim 1, and the § 102(b) rejections of claims 18-25 and 27, which depend from independent claim 17, the references cited by the Examiner fail to disclose at least the recitations of amended independent claims 1 and 17. The dependent claims include the subject matter of amended independent claims 1 and 17, and thus are also patentable over the cited references.

Therefore, for at least the reasons as presented herein above, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection of claims 1-4, 12-13,

15-20 and 27 as being allegedly anticipated by Stiff, and withdrawal of the 35 U.S.C. § 102(b) rejection of claims 17-19, 21-25 and 27 as being allegedly anticipated by Baily.

V. REJECTION UNDER 35 U.S.C. § 103(a) SHOULD BE WITHDRAWN

Claims 5-7 and 10 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, and further in view of EP 508 166 (hereinafter “EP ‘166”). Claim 8 stands rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff in view of EP ‘166, and further in view of U.S. Patent No. 6,264,725 to Stockinger et al. (hereinafter “Stockinger”). Claim 9 stands rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff in view of EP ‘166, and further in view of U.S. Patent No. 5,139,567 to Matsuoka et al. (hereinafter “Matsuoka”). Claim 11 stands rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, and further in view of U.S. Patent No. 3,647,417 to Wetzel et al. (hereinafter “Wetzel”) or U.S. Patent No. 2,014,873 to Wildman (hereinafter “Wildman”). Claim 14 stands rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, and further in view of U.S. Patent No. 2,855,290 to Freeman (hereinafter “Freeman”). Claims 21-25 and 27 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, and further in view of Stockinger. Claims 21 and 23-27 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff, and further in view of U.S. Patent No. 6,875,251 to Gordon et al. (hereinafter “Gordon”). Claims 28-31 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Stiff in view of Stockinger or Gordon, and further in view of U.S. Patent No. 3,592,631 to Cattelain (hereinafter “Cattelain”).

Claims 28-31 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Baily, and further in view of Cattelain.

“To reject claims in an application under Section 103, an examiner must show an unrebutted *prima facie* case of obviousness.” *In re Rouffet*, 47 U.S.P.Q.2d 1453, 1455 (Fed. Cir. 1998). The Supreme Court in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966), stated:

Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

Indeed, to sustain a rejection under 35 U.S.C. § 103(a), there must be some teaching, other than the instant application, to alter the prior art to arrive at the claimed invention. “The problem confronted by the inventor must be considered in determining whether it would have been obvious to combine the references in order to solve the problem.” *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 679 (Fed. Cir. 1998).

The objective standard for determining obviousness under 35 U.S.C. § 103, as set forth in *Graham v. John Deere, Co.*, 383 U.S. 1 (1966), requires a factual determination to ascertain: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; and (3) the differences between the claimed subject matter and the prior art. Based on these factual inquiries, it must then be determined, as a matter of law, whether or not the claimed subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the alleged invention was made. *Graham*, 383 U.S. at 17. Courts have held that there must be some suggestion, motivation or teaching of the desirability of making the combination claimed by the applicant (the

“TSM test”). See *In re Beattie*, 974 F.2d 1309, 1311-12 (Fed. Cir. 1992). This suggestion or motivation may be derived from the prior art itself, including references or disclosures that are known to be of special interest or importance in the field, or from the nature of the problem to be solved. *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996).

Although the Supreme Court criticized the Federal Circuit’s application of the TSM test, see *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, (2007) the Court also indicated that the TSM test is not inconsistent with the *Graham* analysis recited in the *Graham v. John Deere* decision. *Id.*; see *In re Translogic Technology, Inc.*, No. 2006-1192, 2007 U.S. App. LEXIS 23969, *21 (October 12, 2007). Further, the Court underscored that “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *KSR*, 127 S. Ct. at 1741. Under the precedent established in *KSR*, however, the presence or absence of a teaching, suggestion, or motivation to make the claimed invention is merely one factor that may be weighed during the obviousness determination. *Id.* Accordingly, the TSM test should be applied from the perspective of a person of ordinary skill in the art and not the patentee, but that person is creative and not an automaton, constrained by a rigid framework. *Id.* at 1742. However, “the reference[s] must be viewed without the benefit of hindsight afforded to the disclosure.” *In re Paulsen*, 30 F.3d 1475, 1482 (Fed. Cir. 1994).

The prior art cited in an obviousness determination should create a reasonable expectation, but not an absolute prediction, of success in producing the claimed invention. *In re O’Farrell*, 853 F.2d. 894, 903-04 (Fed. Cir. 1988). Both the suggestion

and the expectation of success must be in the prior art, not in applicant's disclosure. *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.*, 927 F.2d 1200, 1207 (Fed. Cir. 1991) (citing *In re Dow Chem. Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988)). Further, the implicit and inherent teachings of a prior art reference may be considered under a Section 103 analysis. See *In re Napier*, 55 F.3d 610, 613 (Fed. Cir. 1995).

Secondary considerations such as commercial success, long-felt but unsolved needs, failure of others, and unexpected results, if present, can also be considered. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538-39 (Fed. Cir. 1983). Although these factors can be considered, they do not control the obviousness conclusion. *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988).

To establish obviousness, the prior art references must be evaluated as a whole for what they fairly teach and neither the references' general nor specific teachings may be ignored. *Application of Lundsford*, 357 F.2d. 385, 389-90 (CCPA 1966). A reference must be considered for all that it teaches, not just what purportedly points toward the invention but also that which teaches away from the invention. *Ashland Oil, Inc. v. Delta Resins & Refractories*, 776 F.2d. 281, 296 (Fed. Cir. 1985).

Regarding the various § 103(a) rejections of claims 5-11 and 14, which depend from amended independent claim 1, and claims 21-31, which depend from amended independent claim 17, as discussed above, because Stiff and Baily fail to disclose, either expressly or inherently, each and every element of amended independent claims 1 and 17, and the claims which depend therefrom recite additional features. Further,

Applicants respectfully assert that these claims are also not disclosed, taught or suggested by Stift and Baily.

Further, dependent claims 5 and 9 have been cancelled. However, certain recited features of the elements of now-cancelled claims 5 and 9 have been incorporated into amended independent claims 1 and 17.

In the Office Action, with respect to now-cancelled claims 5 and 9, the Examiner alleges that the features of now-cancelled claim 5 are taught or suggested by the purported combination of Stift and EP '166, and that the features of now-cancelled claim 9 are taught or suggested by the purported combination of Stift, EP '166 and Matsuoka.

In particular, amended independent claim 1 recites further heating the material remaining, after said zinc vapour has been collected, to a temperature sufficient to effect melting of the iron and lead therein. (**Emphasis added**). Further, amended independent claim 17 recites, *inter alia*, a second furnace chamber in communication with said first furnace chamber to receive therefrom material remaining after said zinc vapour has been collected, and a heating arrangement configured to further heat the remaining material in the second furnace chamber to a temperature sufficient to effect melting of the iron and lead therein. (**Emphasis added**). In summary, these claims recite a process and apparatus, respectively, in which the pre-heating/pre-reduction zone is effective to reduce the zinc to zinc vapour, and in which this zinc vapour is collected before the residual iron and lead are melted.

EP '166 describes making DRI (direct reduced iron) pellets from steel mill waste. (See EP '166, Abstract). Matsuoka describes the recovery of zinc and lead from dust containing zinc. (See Matsuoka, Abstract). However, neither EP '166 nor Matsuoka

teaches further heating the material remaining to melt the iron and lead after the zinc vapour has been collected, as clearly recited in amended independent claims 1 and 17. Indeed, the Examiner does not point to any section of Matsuoka as allegedly teaching such subject matter.

"A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); see *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. at 1739-40 (explaining that when the prior art teaches away from a combination, that combination is more likely to be nonobvious). Additionally, a reference may teach away from a use when that use would render the result inoperable. *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir. 2001).

It is asserted that the combination of Matsuoka with Stift and EP '166 *teaches away* from the invention. In particular, Matsuoka describes an arrangement having a pre-heating/pre-reducing furnace 3, in which the conditions are such that the reduction of iron oxide proceeds selectively while the reduction of zinc oxide is suppressed to a minimum, and the zinc is recovered as vapor from the induction melting furnace 5. (See Matsuoka, col. 5, lns. 5-32) The arrangement of Matsuoka provides co-entrained zinc and lead vapor that must be separated. Thus, while Stift shows an arrangement confined to the recovery of zinc in which the zinc is vaporized in and collected from a muffle furnace, Matsuoka teaches lead is to be recovered as well as zinc through the introduction of a melt furnace, in which the reduction of the zinc in the pre-heating/pre-reduction furnace is minimized, and zinc and lead are collected from the melt furnace.

In Matsuoka, the zinc is not removed before the lead and iron are melted. Therefore, the combination of Stiff and EP '166 with Matsuoka would *teach away* from the recited subject matter of amended independent claims 1 and 17.

Accordingly, the theoretical combination of Stiff or Baily, with EP '166 and/or Matsuoka, would in no way teach or suggest the subject matter recited in amended independent claims 1 and 17.

Therefore, for at least the reasons as presented herein above, Applicants respectfully request withdrawal of the various 35 U.S.C. § 103(a) rejections of claims 5-11, 14 and 21-31.

VI. NEW CLAIM 33

Additionally, new independent claim 33 has been added. Again, Applicants would like to thank the Examiner for indicating the allowability of claim 32 if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

New independent claim 33 includes the subject matter of claim 32, which has been indicated by the Examiner as allowable, and the subject matter of originally filed independent claim 17, from which claim 32 depends. Accordingly, support for the new claim can be found throughout the specification and the originally-filed claims.


Accordingly, Applicants respectfully submit that claim 33 is allowable.

VII. CONCLUSION

In light of the foregoing, Applicants respectfully submit that pending claims 1-4, 6-8, 10-20 and 22-33 are in condition for allowance. Prompt consideration, reconsideration and allowance of the present application are therefore earnestly solicited. If any issues remain outstanding, the Examiner is invited to contact the undersigned via the telephone number provided below.

Respectfully submitted,

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